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Dairy Herd Replacement Costs

TEXAS AGRICULTURAL EXPERIMENT STATION

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SUMMARY

Three tests were conducted in East Texas to determine the costs of raising dairy herd replacements; two of the tests were conducted at Substation No. 2, Tyler, Texas, and the other—called the East Texas Study—in Upshur, Wood, Hopkins and Franklin counties.

The first study at the Tyler station was started in 1950 and the second in 1955. The average cost of raising Jersey herd replacements was $157 per heifer from birth to first lactation. The average age of the 22 heifers at first calf was 2 years, 4 months and 16 days, and their average weight was 818 pounds. The estimated value of these herd replacements at first calf was $250 each.

The East Texas Study was conducted during 1954-57 on 607 Jerseys on 32 farms and on 32 Holsteins on 2 farms. The average total cost of raising herd replacements was $148 per head for Jerseys and $179 per head for Holsteins.

The average total cost of Jersey replacements for both the Tyler station and the East Texas Study was $153 per head.

CONTENTS

Summary 2
Introduction 3
Tyler Station Studies 3
- Experiment A 3
- Experiment B 4
- Results of Experiments A and B 5

East Texas Study 5
- Requirements and Costs for Replacements 5

Breeding Costs 6
Range of Costs by Breeds 7
Suggested Reading 7

Dairy Herd Replacement Costs

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DURING THE RAPID EXPANSION of the dairy industry the past 10 to 12 years, East Texas dairy farmers have purchased a part or all of their herd replacements. It has been impossible for locally produced replacements to supply the demand; therefore, the dairyman either must travel a great distance to select replacements or buy from dealers who import replacements from northern dairy states. Either method is expensive because part of the replacements usually proved unprofitable.

Many dairymen have asked, "Would it pay me to raise and develop my own herd replacements?" They also have asked, "How much does it cost to raise a dairy herd replacement from birth to her first lactation?"

Two experimental tests were initiated at the Tyler station in an attempt to answer these questions: experiment A started in 1950 and experiment B in 1955. Additional data on cost of herd replacements were collected from dairy farms in Northeast Texas through the East Texas Dairy Study during 1954-57. In 1952 a questionnaire on reasons for raising and developing homegrown dairy replacements was mailed to 30 East Texas dairy farmers. Fifteen dairymen representing a total of 170 years of dairy experience answered the questionnaire. The main reasons given for raising and developing homegrown dairy heifers were:

"Less disease in my dairy herd."

"Make more money in lifetime of cow."

"More profitable use of land and labor."

"Homegrown heifers cost less money."

"When you buy you have only the appearance of the individual to go by. Even experts are unable to tell a profitable producer by her appearance."

"Cows and heifers with known value as good producers are not offered for sale at market prices."

TYLER STATION STUDIES

Experiment A

Twelve unselected Jersey heifer calves were entered in a herd replacement cost test at Tyler in the fall of 1950. Each calf was weighed at birth and at 28-day intervals throughout the test period from birth to first lactation. Three pounds of whole milk were fed twice each day for 54 to 87 days, an average of 71 days. The heifers were fed individually the same grain mixture the milking herd received until the calves were weaned from milk. The heifers were placed on pasture at about 6 months of age but continued to receive 2 to 3 pounds of grain until they were 10 to 12 months of age.

Sixty days after the feeding of grain was discontinued it was found that the heifers were not making normal gains in body weight. Grain feeding was started again, but time and body weight already had been lost.

Heifers in this group were not checked for internal parasites; however, data from similar heifers checked in 1955 indicate that the slow growth may have been due partially to stomach worms.

Data of the 7 oldest heifers bred to calve in the fall of 1953 are shown in Table 1. Data of the 5 youngest carried over and bred for fall freshening in 1954 are shown in Table 2.

Tables 1 and 2 combined show data of the 12 original heifers. These heifers freshened at an average age of 2 years, 5 months and 1 day, weighed an average of 807 pounds and cost $136 for hay, grain, labor and equipment per replacement. When the pasture cost obtained in experiment B was applied to experiment A, the total cost was $170.55 per head.

Three of the 7 older heifers and 2 of the younger heifers were sold as low producers during or at the end of the first lactation. There was no significant difference in the production of the heifers calving at an average age of 2 years,

TABLE 1. COST OF RAISING HEIFERS CALVING AT THE AVERAGE AGE OF 2 YEARS, 1 MONTH AND 16 DAYS, EXPERIMENT A, TYLER STATION

Herd no.	Whole milk, pounds	Grain, pounds	Hay, pounds	Total cost of feed except pasture, dollars
199	522	1545	2251	105.15
200	504	1566	2360	106.54
201	450	1628	2658	111.01
202	426	1478	2123	96.12
203	420	1566	2457	103.68
206	432	1496	2813	107.53
208	384	1407	2883	105.82
Average	448	1526	2363	105.12
Average cost of labor and equipment				23.50
Average cost per heifer				128.62
Average weight 764 pounds				

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TABLE 2. COST OF RAISING HEIFERS CALVING AT THE AVERAGE AGE OF 2 YEARS, 10 MONTHS AND 15 DAYS, EXPERIMENT A, TYLER STATION

Herd no.	Whole milk, pounds	Grain, pounds	Hay, pounds	Total cost of feed except pasture, dollars
205	480	1661	2440	117.00[1]
207	390	1564	2523	108.51
210	404	1292	2281	100.32[2]
211	356	1514	3016	117.65
212	320	1408	2952	110.43
Average	390	1488	2642	
Average of 4 after deducting $75 for No. 210				119.73
Average cost for labor and equipment				29.73
Average cost per heifer				149.10
Average weight 884 pounds				

[1]Experiment A feed cost per 100 pounds: milk $5.20, grain $3.27, hay $1.40.
[2]Nonbreeder sold to packing house for $75.

1 month and 16 days and those averaging 2 years, 11 months and 15 days of age.

Experiment B

To obtain additional information on the cost of herd replacements, 10 Jersey heifer calves were placed on a test as they were dropped from August 23 to October 20, 1955. Each calf was weighed at birth and at 28-day intervals throughout the test from birth to first lactation. Heart girth measurements were taken each weigh-day, Table 3. The body weight of each heifer is given in Table 4. All feed, except pasture, fed to each heifer was weighed and recorded. Each calf was allowed to nurse the dam one time before being placed in an individual pen 4 x 6 feet with an individual outside run 4 x 30 feet, Figure 1. Each pen had a hay rack, grain box, mineral box and water bucket. Each calf was started on 6 pounds of whole milk daily and remained on milk or commercial milk substitute for 60 to 62 days. The milk substitute of 1 pound of powder mixed in 9 pounds of water was fed at a temperature of 90°.

The grain mixture used for the milking herd was placed before the calf the second week along

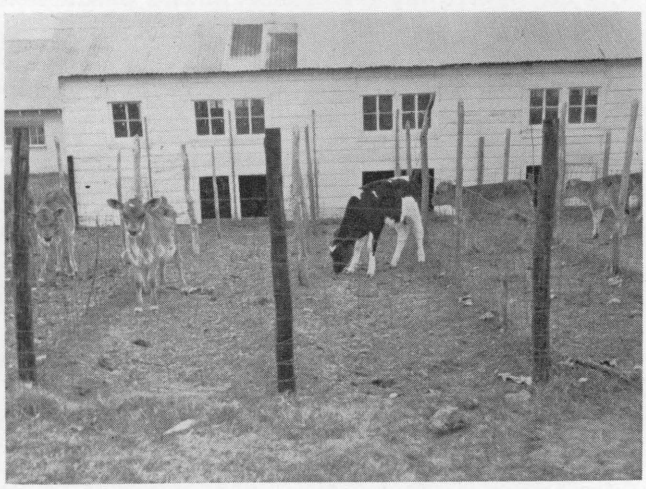


Figure 1. Pens (4 x 30 feet) outside calf barn at Tyler station.

TABLE 3. HEART GIRTH MEASUREMENTS OF 10 JERSEY HEIFERS IN EXPERIMENT B, TYLER STATION

Herd no.	Age, months					
	4	8	12	16	20	24
	Inches					
302	36.0	Died				
303	37.0	46.0	53.0	56.5	59.0	62.0
304	37.5	56.5	53.5	57.0	61.0	63.0
305	36.0	45.0	51.5	55.0	59.5	61.0
306	36.0	43.5	51.0	55.0	59.5	61.0
307	35.5	43.0	48.5	54.5	58.5	60.5
308	36.5	44.5	49.5	Sold		
309	36.5	46.5	50.5	56.0	59.5	61.5
310	37.0	45.0	50.0	55.0	57.5	60.5
311	35.5	42.5	48.5	55.0	58.5	61.0
Average	36.3	44.7	50.7	55.5	59.1	61.3

with a good quality grass hay. Fresh clean water, steamed bone meal and granulated stock salt were placed before each calf at this time. It was necessary to encourage some calves to eat the grain by placing a small portion of grain in their mouths, following the feeding of the milk or milk substitute. The calves were eating 2 to 3 pounds of grain ration per calf per day by the time they were weaned at 60 days of age, Figure 2, but no heifer was fed more than 3 pounds of grain per day at any time from birth to first calf.

The heifers in experiment B were vaccinated for blackleg and brucellosis between 4 and 8 months of age.

From March to October 1956, fecal samples were taken from this group seven times to check for internal parasites. The fecal samples showed a light infestation, which did not warrant treatment and decreased during the spring and summer. There are three reasons for the infestation decreasing when we normally expect an increase in internal parasites. The heifers were rotated on pasture, fed at least 2 pounds of grain per heifer per day and the rainfall was below normal in 1956.

In calculating the average cost of heifers raised, the net loss from heifers No. 302 that died and No. 308 that was sold at a loss was added to the cost of the remaining heifers, Table 5.

TABLE 4. BODY WEIGHT OF 10 JERSEY HEIFERS IN EXPERIMENT B, TYLER STATION

Herd no.	Age, months					
	4	8	12	16	20	24
	Pounds					
302	170	Died				
303	180	320	500	625	700	830
304	160	330	485	590	740	860
305	145	285	450	530	670	760
306	145	285	455	550	690	750
307	150	285	415	485	630	720
308	165	295	405	Sold		
309	165	310	445	530	700	800
310	160	300	420	485	610	745
311	135	250	395	465	615	775
Average	157	296	441	432	669	780

The pounds of feed consumed by each herd replacement is shown in Table 6. The cost of the feed along with other items of expense involved in raising calves for herd replacements is shown in Table 5. These heifers calved for first lactation at an average age of 2 years, 27 days and weighed 805 pounds each.

Results of Experiments A and B

The estimated price at which these herd replacements could have been purchased was $250 each. The group in experiment A cost $170.55 for labor, equipment and feed, including pasture, for each calf up to calving time. The average cost from birth to calving time for each heifer in experiment B was $139.63. The costs included pasture, feed, labor, equipment and veterinary services.

The total costs in experiment B were lower than those in experiment A. The commercial milk replacer used to replace a portion of the more expensive milk used in experiment A reduced the cost by $10 per heifer; the concentrates used during experiment B were available at lower prices, and less labor, equipment and hay were required.

No charge was made for registration fees or breeding services. These tests show that in East Texas, herd replacements can be raised for less money than they can be purchased. If and when most dairymen raise all their replacements, it might become possible to buy herd replacements for less money than they can be raised. However, because of the risk of introducing diseases and the possibility of buying low quality animals, it is a sound practice for dairymen to raise their own herd replacements.

TABLE 5. TOTAL COST OF HAY, GRAIN, LABOR, EQUIPMENT AND VETERINARY SERVICE, TYLER STATION

Herd no.	Milk and milk substitute	Hay and grain	Labor and equipment	Veterinary	Total cost except pasture
	— — — — —		Dollars	— — —	— — —
302	18.70	15.21	10.00	9.00	52.91
303	18.05	64.47	18.50	2.28	103.30
304	18.05	60.30	18.50	2.28	99.13
305	15.27	61.96	18.50	2.28	98.01
306	13.85	62.35	18.50	2.28	96.98
307	11.29	59.53	18.50	2.28	91.50
308	10.64	32.09	14.00	2.28	59.01
309	10.64	59.82	18.50	2.28	91.24
310	9.35	61.70	18.50	2.28	91.83
311	8.70	61.61	18.50	2.28	91.09
Average of 8 head	13.45	61.47	18.50	2.28	95.38[1]
Including cost of heifer No. 302 and net cost of heifer No. 308 increases the cost of each replacement to					105.08
The heifers received 52 percent of total feed from pasture valued at $80.60					
Estimated cost of pasture[2]					34.55
Average complete cost					$139.63

[1]Experiment B feed cost per 100 pounds: milk $5.46, milk substitute (wet) $1.88, grain $2.60 and hay $1.45.
[2]Based on data from 5-year test on improved vs. unimproved pasture for dairy cows.

Figure 2. Experimental heifers at weaning age.

EAST TEXAS STUDY

The East Texas Study was conducted on 34 dairy farms during 1954-57 to determine the requirements and costs of raising heifer calves from birth to calving time. Information was obtained on 639 animals from 34 farms in Upshur, Wood, Hopkins and Franklin counties.

Jersey and Jersey crosses accounted for 607 animals in 32 herds, while the remaining 32 animals were found in 2 Holstein herds. During the summer and fall of 1954, a total of 286 calves was born and in 1955 the number dropped was 353. These data were obtained under farm conditions and it was impossible to get weights or body measurements of the heifers raised.

Twenty calves under 6 months and 12 head over that age died during the 4-year period. The cost of raising these calves up to that time was charged to the remaining calves on the farm from which they were lost. Table 7 shows the cost of raising 639 calves to calving time.

Requirements and Costs for Replacements

Calves dropped during the summer and fall usually were fed grain and hay until grass was good in the spring. During years of normal rain-

TABLE 6. TOTAL AMOUNT OF FEED CONSUMED, AGE AND WEIGHT AT CALVING, EXPERIMENT B, TYLER STATION

Herd no.	Milk	Milk substitute	Hay	Grain	On grain	At calving	
	Pounds		Pounds		Days	Pounds	Days
302	327	45	288	499	Died 222 days		
303	315	45	1232	1766	625	850	749
304	306	72	1103	1680	605	865	729
305	228	150	1274	1658	588	785	767
306	198	162	1191	1703	600	785	724
307	120	252	1273	1571	562	775	819
308	108	252	380	1122	Sold 403 days ($34.38)		
309	108	252	1266	1582	571	800	740
310	66	306	1407	1579	574	760	745
311	54	306	1407	1590	544	825	786
Average of 8 head	162	193	1269	1641	584	805	757

TABLE 7. SUMMARY OF REQUIREMENTS AND COSTS OF RAISING DAIRY HEIFERS, EAST TEXAS STUDY, 1954-57

Item	Jerseys		Holsteins	
Number of farms	32		2	
Number of animals	607		32	
Feed per heifer	Pounds	Dollars	Pounds	Dollars
Whole milk	398	21.89	43	2.15
Milk replacer (dry weight)	14	2.73	42	7.98
Calf starter	78	5.07		
Dairy ration	917	27.72	1480	40.95
Other	288	8.74	920	30.22
Total milk and concentrate	1695	66.15	2485	81.30
Hay				
Legume	154	2.76	700	12.25
Grass and oat	825	12.47	1135	18.50
Total hay	979	15.23	1835	30.75
Total feed cost		81.38		112.05
Costs other than feed		Dollars		
Labor		12.00		
Housing		5.00		
Breeding		13.75		
Veterinary care		1.50		
Total		32.25		
			Jerseys	Holsteins
Total cost per head from birth to first calf pasture costs not included			$113.63	$144.30
Days on pasture		380		

fall, no supplemental feeding was done until fall. Heifers were wintered on hay, grain and protein supplements.

Winter pasture was used when it was available. Most dairymen in the East Texas Study fed heifers some grain 3 to 4 weeks before freshening. All heifers at the Tyler station were fed grain not less than 30 days before calving.

The Jersey calves consumed an average of 398 pounds of whole milk and 14 pounds of dry milk replacer at a cost of $24.62 per calf, Table 7. The Holstein calves averaged 43 pounds of whole milk and 42 pounds of dry milk substitute worth a total of $10.13.

A dairy ration formed the bulk of the grain ration fed to the calves. However, limited quantities of commercial calf starter, calf developer, cottonseed products, oats, ground ear corn, ground sorghum and bran were fed. The Jersey calves consumed 1,283 pounds of grain per calf and the Holsteins consumed 2,400 pounds per calf at a cost of $41.53 and $71.17, respectively.

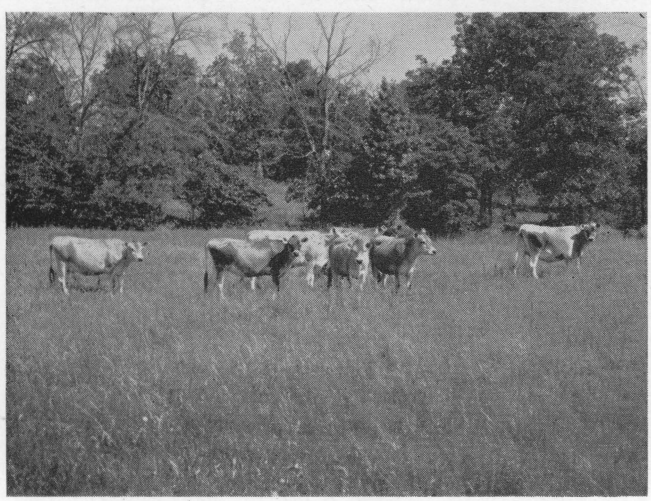


Figure 3. Developed Jersey heifers.

All the calves received both grass and legume hay at various times during the study. The grass hay consisted mainly of Common Bermudagrass and oats, while alfalfa and Serecia lespedeza made up the larger portion of legume hay.

Expenses other than feed costs totaled $32.25, Table 7. Labor was calculated on the basis of $1 per hour of work. Included in veterinary care costs were brucellosis and blackleg vaccinations, scour medicine and an occasional call by the veterinarian to examine and treat a sick animal.

Shelter for young dairy animals consisted largely of sheds and inexpensive structures that provided the necessary shade and protection from severe weather. Housing costs included normal depreciation of the building used (based on a 20-year life) plus annual repairs and upkeep.

BREEDING COSTS

Since most of the dairymen kept one or more bulls for breeding, the breeding cost was analyzed from the natural breeding standpoint only in the East Texas Study. On the average, each bull was used for 2 years and during this time sired 24 heifer calves to be raised for replacements. The purchase price of herd bulls usually was higher than their value when sold. Therefore, depreciation (difference between purchase and selling price) was added to the feed and labor costs in calculating breeding costs. The breeding cost per calf was determined by dividing the number of heifer calves per sire into the total cost per bull. Of the calves born, no credit was allowed for bull calves because their market value about equaled their marketing cost. However, during times of high beef cattle prices, an adjustment would be necessary.

Data on breeding at the Tyler station show a breeding cost of $10 per heifer dropped from natural breeding.

At the Tyler station during the past 10 years, 80 cows were serviced by artificial insemination at a total cost of $501. Of the 80 mated artificially, 63 produced calves, of which only 22 were heifers. This gives an average breeding cost of about $23 per heifer calf produced. A sex ratio of 50 percent heifers dropped would have reduced the breeding cost to about $16 per heifer calf produced.

In comparing costs of buying replacement females versus raising them, it should be noted that the dairyman who buys replacements also

has a breeding cost. To own and feed a bull suitable for such herds costs $8 to $10 per cow of breeding age.

RANGE OF COSTS BY BREEDS

Heifers raised by cooperating dairymen were not weighed and it is not known how the weight of these heifers compared with animals produced on the Tyler station. However, the heifers raised on the station were well grown and were considered to be above the average of dairy heifers grown in the area, Figure 3.

Data from the East Texas Study combined with data from the Tyler station gave the following range in cost of raising Jersey replacements.

	Low	High	Average
Tyler station	$106.00	$136.00	$123.00
East Texas Study	90.00	130.00	113.63
Total average cost, not including pasture	98.00	133.00	118.21

If the estimated pasture cost, based on results at the Tyler station, were added to the cost shown in the East Texas Study and at the Tyler station, the total cost of a Jersey replacement would be $148 in the East Texas Study and $157 at the Tyler station. On the same basis, the average total cost of a Holstein replacement would be about $179.

SUGGESTED READING

B-178 Raising Dairy Calves. Burleson, R. E. and Leighton, R. E. 1955. Agricultural Extension Service, Texas A&M College System.

C-284 Developing Dairy Heifers. Burleson, R. E. and Leighton, R. E. 1950. Agricultural Extension Service, Texas A&M College System.

PR-1877 Effects of Marcol B-75 in a Whole Milk Replacer. Leighton, R. E. 1956. Agricultural Experiment Station, Texas A&M College System.

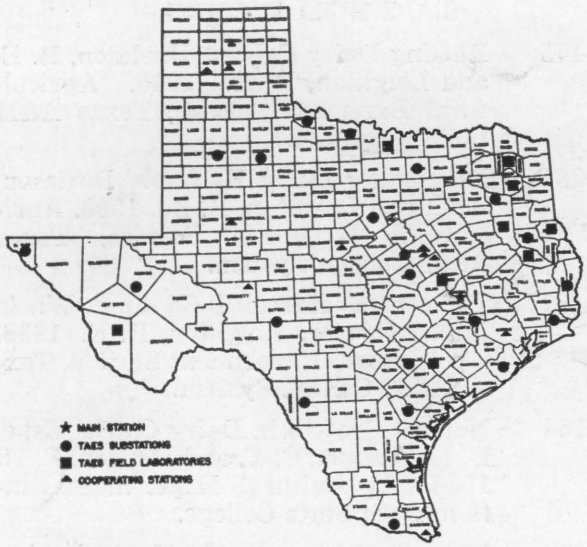
B-154 Normal Growth in Dairy Cattle. Espe, D. L., Cannon, C. Y. and Hansen, E. N. 1932. Agricultural Experiment Station, Iowa State College.

B-622 Dairy Calf Losses in the Kentucky Agricultural Experiment Station Herd. 1955. Lassiter, C. A. and Seath, D. M. University of Kentucky.

B-494 Dairy Calf Research in Louisiana. Rusoff, L. L. and Frye, J. B., Jr. 1955. Agricultural Experiment Station, Louisiana State University.

C-79 Watch Your Dairy Cattle Grow! Bowling, G. A. and Putnam, D. N. 1943. Agricultural Experiment Station, West Virginia University.

Research Report No. 15 High-roughage Rations for Dairy Heifers. Converse, H. T. U. S. Department of Agriculture.



Location of field research units of the Texas Agricultural Experiment Station and cooperating agencies

State-wide Research

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The Texas Agricultural Experiment Station is the public agricultural research agency of the State of Texas, and is one of ten parts of the Texas A&M College System

ORGANIZATION

IN THE MAIN STATION, with headquarters at College Station, are 16 subject-matter departments, 2 service departments, 3 regulatory services and the administrative staff. Located out in the major agricultural areas of Texas are 21 substations and 9 field laboratories. In addition, there are 14 cooperating stations owned by other agencies. Cooperating agencies include the Texas Forest Service, Game and Fish Commission of Texas, Texas Prison System, U. S. Department of Agriculture, University of Texas, Texas Technological College, Texas College of Arts and Industries and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

OPERATION

THE TEXAS STATION is conducting about 400 active research projects, grouped in 25 programs, which include all phases of agriculture in Texas. Among these are:

Conservation and improvement of soil
Conservation and use of water
Grasses and legumes
Grain crops
Cotton and other fiber crops
Vegetable crops
Citrus and other subtropical fruits
Fruits and nuts
Oil seed crops
Ornamental plants
Brush and weeds
Insects
Beef cattle
Dairy cattle
Sheep and goats
Swine
Chickens and turkeys
Animal diseases and parasites
Fish and game
Farm and ranch engineering
Farm and ranch business
Marketing agricultural products
Rural home economics
Rural agricultural economics
Plant diseases

Two additional programs are maintenance and upkeep, and central services.

Research results are carried to Texas farmers, ranchmen and homemakers by county agents and specialists of the Texas Agricultural Extension Service

AGRICULTURAL RESEARCH seeks the WHATS, the WHYS, the WHENS, the WHERES and the HOWS of hundreds of problems which confront operators of farms and ranches, and the many industries depending on or serving agriculture. Workers of the Main Station and the field units of the Texas Agricultural Experiment Station seek diligently to find solutions to these problems.

Today's Research Is Tomorrow's Progress